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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,894	10/17/2005	Robert L. Long	2001B101B	6402

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EXAMINER	
NEGIN, RUSSELL SCOTT	
ART UNIT	PAPER NUMBER
1631	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/528,894	LONG ET AL.	
	Examiner	Art Unit	
	RUSSELL S. NEGIN	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Comments

Applicants' amendments and request for reconsideration in the communication filed on 8 June 2009 are acknowledged and the amendments are entered.

Claims 1-34 are pending and examined in the instant Office action.

Withdrawn Objections/Rejections

The objections to claims 35 and 39 because of informalities have been withdrawn in view of the amendments filed to the instant set of claims on 8 June 2009.

The rejections of claims 3, 13-20, 23, and 30-34 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention are withdrawn in view of arguments filed on page 10 of the Remarks.

The rejections of claims 35-44 under 35 U.S.C. 103(a) as being unpatentable over Selliers [US Patent 6,144,897; issued 7 November 2000; on IDS] in view of Long et al. as evidenced by Geosoft are withdrawn in view of amendments filed to the instant set of claims on 8 June 2009.

The rejections of claims 37 and 45-48 under 35 U.S.C. 103(a) as being unpatentable over Carrabba et al. [US Patent 5,112,127; issued 12 May 1992] in view of Limb et al. [Applied Physics Letters, volume 68, 1996, pages 2810-2812] are withdrawn in view of amendments filed to the instant set of claims on 8 June 2009.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following rejections are reiterated from the previous Office action:

Claims 1-7, 9, 11-15, 17, 19-28, and 30-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Long et al. [WO 01/09203 A1; published 8 February 2001; on IDS] in light of Geosoft [Geosoft Technical Note, downloaded online from geosoft.com in February 2009; twelve pages unnumbered].

Claim 1 is drawn to a process for determining polymer properties in a polymerization reactor system. This process comprises obtaining a regression model for determining a polymer property that determines principal component loadings and principal component scores. The process uses a Raman probe that is inserted into the reactor system to acquire a Raman spectrum of an *in situ* olefin sample. Next, a new principal component score from at least a portion of the Raman spectrum and the principal component loadings are calculated. Finally, the polymer property is calculated by applying the new principal component score to the regression model.

The document of Long et al. is a Raman analysis system for olefin polymerization control. Specifically, page 3, lines 10-20 of Long et al. state the following:

> Without limiting the present invention to any particular spectroscopic analysis technique, the inventors have observed in a slurry reaction environment a correlation between in-situ collected

> Raman spectra (a product of Raman spectroscopy) from the liquid phase of the reaction environment and the concentration of at least one reactor constituent. Furthermore, the inventors have discovered that this correlation, in combination with in-situ, real time analysis of at least one reactor constituent in such a reactor will allow for improved control of the final product properties, such as melt flow rate. Improved control of the final product properties is achieved by metering the flow of at least one reactor constituent into the slurry reactor in response to the in-situ measured concentration of at least one reactor constituent.

Consequently, Long et al. is determining polymer properties (such as melt flow rate) in a reactor system wherein the Raman spectra are acquired from an *in situ* sample using a Raman probe in a the slurry reactor system. [preamble and final "wherein" clause]

Additionally, page 4, lines 11-23 of Long et al. describes a correlation step that correlates olefin polymerization to physical properties to melt flow rate. More specifically, page 19, lines 1-12 of Long et al. teach use of principal component analysis and scores to correlate spectral data to specific polymer properties. [steps a and b]

Additionally, page 19, lines 8-17 of Long et al. teach a specific regression analysis between spectral data and scores that is optimized to produce a predicted value of a property. This model is applied to a portion of the Raman spectrum illustrated in Figure 8 of Long et al. to result in new principal component scores [see for example, page 19, lines 19-30 of Long et al.] [step c]

Additionally, this principal component analysis, when applied to the portion of the Raman spectrum in Figure 8, results in a calculation of a new polymer property as listed in line 30, page 19 to line 4 on page 20 [i.e. the prediction of MFR (melt flow rate) of polypropylene granules] (step d of claim 1).

While Long et al. describes PCA in detail, Long et al. does not mention the term principal component loadings in the document. Consequently, the Geosoft Technical

Note shows that it is inherent to use principal component loadings for PCA analysis (see for example, second page of Geosoft).

With regard to claim 2, Example 3 and Figures 7-8 illustrate a plurality of Raman spectra of sample comprising polyolefins.

With regard to claim 3, the equation on page 19 of Long et al. lists a locally weighted regression model.

With regard to claim 4, the property analyzed is melt flow rate (MFR) [see pages 19-20 of Long et al.].

With regard to claim 5, line 3 of page 20 of Long et al. teaches polypropylene granules.

With regard to claim 6, page 4, lines 11-23 of Long et al. teaches acquiring a Raman spectrum irradiating the sample of polyolefin and collecting the scattered radiation during sampling interval. Purging and purging fluids are described on page 13, lines 1-10 of Long et al.

With regard to claim 7, the abstract of Long et al. describes a fluidized bed slurry reactor.

With regard to claim 9, page 3, lines 20-25 of Long et al. described the Raman probe being IN SITU with the moving slurry polymer bed.

With regard to claim 11, Figure 1 of Long et al. illustrates a Raman probe IN SITU in the reactor body.

With regard to claim 12, purging the polymer is described in page 13, lines 1-10 of Long et al.

Independent claim 13 is the same as dependent claim 4 in independent form. Consequently, since claim 4 is anticipated, independent claim 13 is anticipated as well.

Claim 14 is drawn to the same subject matter as claim 2, but is dependent from claim 13. Consequently, since claim 2 is anticipated, claim 14, is anticipated as well.

Claim 15 is drawn to the same subject matter as claim 6, but is dependent from claim 13. Consequently, since claim 6 is anticipated, claim 15, is anticipated as well.

Claim 17 is drawn to the same subject matter as claim 9, but is dependent from claim 13. Consequently, since claim 9 is anticipated, claim 17, is anticipated as well

Claim 19 is drawn to the same subject matter as claim 11, but is dependent from claim 13. Consequently, since claim 11 is anticipated, claim 19, is anticipated as well.

Claim 20 is drawn to the same subject matter as claim 12, but is dependent from claim 13. Consequently, since claim 12 is anticipated, claim 20, is anticipated as well.

Independent claim 21 is drawn to the same subject matter as independent claim 1 with the additional limitation of adjusting at least one polymerization parameter based on the calculated polymer property. Page 8, lines 5-12 of Long et al. teach that the polymerization reaction control is achieved by metering the flow of reactants into the reactor in response to Raman sampling data. Page 8, lines 21-30 explains in further detail what the control variable and manipulated variables are. For example, melt flow rate is a control variable, and hydrogen flow rate is a manipulated variable.

Claim 22 is drawn to the same subject matter as claim 2, but is dependent from claim 21. Consequently, since claim 2 is anticipated, claim 22, is anticipated as well.

Claim 23 is drawn to the same subject matter as claim 3, but is dependent from claim 21. Consequently, since claim 3 is anticipated, claim 23, is anticipated as well.

Claim 24 is drawn to the same subject matter as claim 4, but is dependent from claim 21. Consequently, since claim 4 is anticipated, claim 24, is anticipated as well.

Claim 25 is drawn to the same subject matter as claim 5, but is dependent from claim 21. Consequently, since claim 5 is anticipated, claim 25, is anticipated as well.

Claim 26 is drawn to the same subject matter as claim 6, but is dependent from claim 21. Consequently, since claim 6 is anticipated, claim 26, is anticipated as well.

Claim 27 is drawn to the same subject matter as claim 7, but is dependent from claim 21. Consequently, since claim 7 is anticipated, claim 27, is anticipated as well.

With regard to claim 28, hydrogen flow rate, total feed rate, and catalyst flow rate are described in page 8 lines 20-25 of Long et al. as being parameters that are manipulated.

Independent claim 30 is drawn to the same subject matter as independent claim 21 with the additional limitation obtaining polymer properties comprising melt flow rate. As explained for claim 21 above, page 8, lines 5-12 of Long et al. teach that the polymerization reaction control is achieved by metering the flow of reactants into the reactor in response to Raman sampling data. Page 8, lines 21-30 explains in further detail what the control variable and manipulated variables are. For example, melt flow rate is a control variable, and hydrogen flow rate is a manipulated variable.

Claim 31 is drawn to the same subject matter as claim 2, but is dependent from claim 30. Consequently, since claim 2 is anticipated, claim 31, is anticipated as well.

Claim 32 is drawn to the same subject matter as claim 6, but is dependent from claim 30. Consequently, since claim 6 is anticipated, claim 32, is anticipated as well.

With regard to claim 33, hydrogen flow rate, total feed rate, and catalyst flow rate are described in page 8 lines 20-25 of Long et al. as being parameters that are manipulated.

Response to Arguments:

Applicant's arguments filed 8 June 2009 have been fully considered but they are not persuasive.

Applicant first argues on page 11 of the Remarks that in the instant claims, there is no need to "make a correlation between a measured reaction mixture constituent concentration and a projected ultimate polymer product property." This argument is not persuasive because language in the instantly rejected claims that support this allegedly claimed limitation is not found in the instant set of claims. While applicant argues that the invention is drawn to DIRECTLY determining polymer properties, these limitations are not found in the instantly rejected claims. In other words, correlation of experimental and computational data is still encompassed by the limitations of the instantly rejected claims.

Applicant next argues on page 12 of the Remarks that since the Geosoft reference is dated after the filing date of the application (i.e. post-art), it is not applicable in the instant rejection. This argument is not persuasive because while the Geosoft reference is post-art, this reference is utilized to demonstrate an inherent property applicable to the prior art of Long et al. Applicant is directed to MPEP section 2112 (specifically subsection II, "Inherent feature need not be recognized at the time of the invention"), for the rules which state that art need not filed prior to the filing date if it teaches an inherent property. It is noted that in the Remarks, whether the teachings of Geosoft are inherent (rather than obvious) is not disputed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following rejections are reiterated from the previous Office action:

35 U.S.C. 103 Rejection #1:

Claims 8, 10, 16, 18, 29 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Long et al. as evidenced by Geosoft as applied to claims 1-7, 9, 11-15, 17, and 19-20 above.

Claims 8, 16, 29 and 34 are dependent from claims 1, 13, 21, and 30 respectively and comprise:

(i) obtaining a second regression model for determining a second polymer property, the second regression model including second principal component loadings and second principal component scores;

(ii) calculating a new second principal component score from at least a portion of the Raman spectrum and the second principal component loadings; and

(iii) calculating the second polymer property by applying the new second principal component score to the second regression model.

Claims 10 and 18 are further limiting wherein the Raman probe is inserted in situ into the reactor comprising the location of the product discharge.

Long et al. teaches a process for determining polymer properties in a polymerization reaction, as described above. Long et al. also teach in the abstract that the in situ location of the Raman probe allows reactor conditions to be metered.

While Long et al. teaches regression to identify predicted properties of a first polymer property, and Long et al. identifies second polymer properties such as ethylene concentration (page 22 of Long et al.) or polyethylene copolymer measurements (page 23 of Long et al.), Long et al. does not explicitly state that the regression and PCA analysis for melt flow rate (as described above) is applied to these other properties. Additionally, Long et al. does not give an explicit location of the in situ probe within the reactor.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to apply the regression analysis with regard to melt flow rate as described in Example 3 of Long et al. to the other properties listed above, wherein the motivation would have been that regression/PCA analysis has the advantage of providing clear and optimal parameters to fit the equations describing the parameters of interest (see for example, the equation on page 23 of Long et al.). It would have been further obvious to someone or ordinary skill in the art at the time of the instant invention to place the in situ probe near the discharging of the product stream wherein the motivation would have been that constituents (i.e. the product output and reaction efficacy) are more easily measured (i.e. "metered") near the location of the probe [see abstract of Long et al., page 3 lines 10-20 of Long et al. and page 8, lines 10-12 of Long et al.]

Response to Arguments:

Applicant's arguments filed 8 June 2009 have been fully considered but they are not persuasive.

It is noted that there are no new arguments applicable to this obviousness prior art rejection that were not already addressed in the anticipatory prior art rejection. Therefore the arguments from the above 35 U.S.C. 102 rejection are reiterated here.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory

double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

The following rejection is reiterated from the previous Office action:

Double Patenting Rejection #1:

Claims 1-8, 13-16, and 21-34 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent No. 7,116,414 in view of Long et al. [WO 01/09203 A1; published 8 February 2001; on IDS]

Instant claims 1-8, 13-16, and 21-34 are identical to claims 1-26 of '414 with the exception that the claims of '414 lack the final "wherein" clause that requires the Raman probe to be located in situ. Long et al. describes in the abstract the use of in situ Raman probes for assessing polymerization [see abstract]. Long et al. describes that it would be obvious to put the probe in the reactor for closer metering of reactor constituents.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to modify the process for determining polymer properties in a polymerization reactor system of '414 by use of the in situ probe of Long et al. wherein

the motivation would have been that the location of the probe in the reactor allows for closer metering of reactor constituents [see abstract of Long et al.]

Response to Arguments:

Applicant had no arguments specific to this double patenting rejection other than a request that this rejection be held in abeyance until further prosecution occurs.

The following rejection is reiterated from the previous Office action

Double Patenting Rejection #2:

Claims 1-8, 13-16, 21-25, 28-29, and 30-34 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6, 9, 13-16, 20-24, 28-29 and 33-37 of U.S. Patent No. 7,106,437 in view of Long et al. [WO 01/09203 A1; published 8 February 2001; on IDS]

Instant claims 1-8, 13-16, 21-25, 28-29, and 30-34 are nearly identical to claims 1-6, 9, 13-16, 20-24, 28-29 and 33-37 of '437 with the exception that the claims of '437 lack the final "wherein" clause that requires the Raman probe to be located in situ. Long et al. describes in the abstract the use of in situ Raman probes for assessing polymerization [see abstract]. Long et al. describes that it would be obvious to put he probe in the reactor for closer metering of reactor constituents. Additionally, the claims of '437 are narrower in that they require use of a slurry bed.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to modify the process for determining polymer properties in a slurry

polymerization reactor system of '437 by use of the in situ probe of Long et al. wherein the motivation would have been that the location of the probe in the reactor allows for closer metering of reactor constituents [see abstract of Long et al.]

Response to Arguments:

Applicant had no arguments specific to this double patenting rejection other than a request that this rejection be held in abeyance until further prosecution occurs.

Conclusion

No claim is allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the

central PTO Fax Center. The faxing of such pages must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CFR § 1.6(d)). The Central PTO Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Negin, whose telephone number is (571) 272-1083. The examiner can normally be reached on Monday-Friday from 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Marjorie Moran, Supervisory Patent Examiner, can be reached at (571) 272-0720.

Information regarding the status of the application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information on the PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/RSN/
Russell S. Negin
1 September 2009

/Marjorie Moran/
Supervisory Patent Examiner, Art Unit 1631